Loureiro Engineering Associates, Inc.

August 26, 2004

United States Environmental Protection Agency, Region I
1 Congress Street
Suite 1100
Mail Code HBT
Boston, Massachusetts 02114-2023

Attn: Ms. Carolyn Casey

RE: Environmental Indicator Determination Report (CA725)
MacDermid, Incorporated
526 Huntingdon Avenue, Waterbury, Connecticut
LEA Comm. No. 91MH401

Dear Ms. Casey,

On behalf of MacDermid, Inc., Loureiro Engineering Associates (LEA) has prepared this letter and associated attachments to address your April 9, 2004 comment letter pertaining to the revised *Documentation of Environmental Indicator (EI) Determination, Current Human Exposures Under Control for the MacDermid, Inc. Waterbury, CT. Facility,* prepared by LEA and dated January 2004, for the MacDermid facility located at 526 Huntingdon Avenue (the Site). LEA prepared a *Revised Documentation of Environmental Indicator (EI) Determination, Current Human Exposures Under Control for the MacDermid, Inc. Waterbury, CT. Facility,* **dated August 26, 2004** and this comment response letter in support of MacDermid's participation in the Voluntary Corrective Action Program (VCAP).

The United States Environmental Protection Agency's (EPA) comments are presented in italics below, followed by MacDermid's responses which have been prepared by LEA.

Sincerely,

LOUREIRO ENGINEERING ASSOCIATES, INC.

Brian A. Cutler, P.E., L.E.P.
Senior Vice President

Enclosures

cc Mr. Richard Nave, MacDermid, Inc.

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GENERAL COMMENTS

1. *Please provide copies of the laboratory data sheets, chain of custody forms and filed logs for this sampling effort. Also, please submit copies of any other new data (groundwater, soils, surface water, sediments) collected since the last submittal, dated April 2003.*

Copies of monitoring well construction reports, boring logs, and laboratory data reports and associated chain of custody forms, for the all activities completed from July 2002 until September 2003 are provided in Attachments 3, 4, and 7, respectively, of the revised *Documentation of Environmental Indicator (EI) Determination, Current Human Exposures Under Control for the MacDermid, Inc. Waterbury, CT. Facility,* dated August 26, 2004 (August 2004 Revised EI). Copies of field documentation, monitoring well construction reports, boring logs, and laboratory data reports and associated chain of custody forms for activities completed from September 2003 until the submittal of this response letter are provided in Exhibits C, D, F, and G, respectively, of the report entitled *Technical Memorandum, Additional Subsurface Investigations, August 2004, MacDermid, 526 Huntingdon Avenue, Waterbury, CT* (Technical Memorandum), prepared by LEA for submittal on August 26, 2004. The Technical Memorandum is provided in Attachment 5 of the August 2004 Revised EI. The Technical Memorandum was prepared in response to the report entitled *Additional Investigations Work Plan and Quality Assurance Project Plan for Documentation of Environmental Indicator Determination (CA725) Current Human Exposures Under Control, MacDermid, Incorporated, Waterbury, CT* (Work Plan), prepared by LEA on behalf of MacDermid, Incorporated and submitted to the EPA on June 24, 2004. The Work Plan is provided as Exhibit A of the Technical Memorandum.

2. *Please provide copies of the boring and well installation logs for the new wells (MW-116S and MW116D).*

Copies of the boring and monitoring well construction logs for the monitoring wells MW-116S and MW-116D are provided in Attachment 3 and 4, respectively, of the August 2004 Revised EI.

3. *MacDermid, Inc. has indicated throughout the EI that the groundwater flow direction at the site is to the south, toward the Naugatuck River, based on data collected from site wells, including two newly-installed wells on the southwestern property boundary. However, the groundwater contours depicted on Drawing 2 do not appear to accurately reflect the groundwater elevation data collected, so it is still unknown whether groundwater may be flowing southwest, potentially towards the residential properties and further southwest to Steele Brook. For example, the groundwater elevation in the newly-installed well MW-116S is reported as 963.08 feet on Drawing 2 and the elevation in nearby well MW-112 is reported as 963.18 feet. It is unclear why well MW-116S is depicted closer to the 964 foot contour line than well MW-112, which reported a higher groundwater elevation. A more accurate representation of groundwater flow based on the collected data may indicate a westerly flow component in this area of the site. It also appears that a limited number of wells were used to generate data for the groundwater elevation map, which may have contributed to a groundwater flow interpretation that is not entirely supported. Wells MW-104, MW-106, MW-107, and MW-108 were not used in the development of the contours for various reasons (i.e., wells were destroyed, wells reported product, etc.), as noted on*

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Figure 2. According to Table 1 in Attachment 3, it also appears that groundwater data was not collected from well MW-103, although this is not indicated in the Notes section on Figure 2.

An accurate assessment of groundwater flow direction is essential for this CA725 for several reasons:

MacDermid has concluded that the potential exposure risk via volatilization of contaminants in groundwater to off-site residential properties located southwest of the site is eliminated since groundwater has been reported not to flow in a direction of nearby residents but instead to flow to the south (Response to Specific Comment, Question 2, #1). A concentration of vinyl chloride was detected in well MW-116D, located on the southwestern property boundary, above the proposed Connecticut Remediation Standard Regulation (CT RSR) Volatilization Criteria (VC) during the September 2003 sampling event (Attachment 3, Table 3). Due to the volatility of vinyl chloride, detection at the concentrations and depths of these samples is somewhat unusual and concentrations could actually be greater.

MacDermid has concluded that groundwater flows to the south, toward the Naugatuck River and does not appear to discharge to Steele Brook, located southwest of the site. Therefore, MacDermid further indicates "impact to sediment or surface water [by groundwater discharge] in this brook is precluded" (Response to Specific Comment, Question 2, #2).

Revise the EI Determination to further support the depicted southerly groundwater flow interpretation with additional information or data, or address the potential exposure risks that may be associated with a southwesterly groundwater flow direction (i.e. potential impacts to indoor air in residential properties, and potential impacts to Steele Brooke). If off-site monitoring wells are proposed in the residential area near Huntington Place, the wells should be designed to support the groundwater flow directions along the western side of the site and to characterize the levels of site-related contaminants in groundwater west of the site. In addition at least one more round of groundwater samples and depth to water measurements should be collected. A work plan and quality assurance project plan should be completed for the well installation and for additional sampling. These plans are necessary to ensure the quality of the data and so that EPA can plan to collect split samples if desired.

An explanation should be provided in the EI for the suspected source of the vinyl chloride in monitoring well MW-116D. This contaminant may be related to historical site operations and, therefore, it may be indicative of groundwater flow from the operations area of the facility toward the western boundary of the site. Additionally, indicate the rationale for excluding well MW-103 from groundwater level measurements in the Notes section on Drawing 2.

As previously mentioned, a report entitled *Additional Investigations Work Plan and Quality Assurance Project Plan for Documentation of Environmental Indicator Determination (CA725) Current Human Exposures Under Control, MacDermid, Incorporated, Waterbury, CT* (Work Plan), was prepared by LEA on behalf of MacDermid, Incorporated and submitted to the EPA on June 24, 2004. The subsurface investigations proposed in the Work Plan included the installation of four piezometers for the measurement of water levels and four groundwater monitoring wells installed in two clusters (with each

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cluster composed of a shallow and deep well), the collection of one round of groundwater sampling from all existing and newly installed monitoring wells at the Site, and measurement of water levels in all existing and newly installed monitoring wells and piezometers. The premise behind the installation of the two sets of cluster wells was to provide a more refined understanding of groundwater flow direction and contaminant concentrations along the western Site boundary in both the horizontal and vertical directions. Such an understanding was necessary due to the presence of residential properties situated west of the Site at which the potential for indoor air volatilization of VOC contaminants in groundwater required further evaluation.

The Technical Memorandum (cited in Question 1 above) was prepared in response to the Work Plan. As discussed in further detail in the Technical Memorandum (Attachment 5 of the August 2004 Revised EI), four additional piezometers (PZ-01 through PZ-04) and two additional monitoring well clusters (MW-117S/MW-117D and MW-118S/MW-118D) were installed at the Site. Piezometers PZ-01, PZ-02, PZ-03, and PZ-04 were advanced either upgradient or sidegradient of monitoring wells MW-104, MW-106, MW-107, and MW-108, respectively. Drawing 1 - Site Plan and Drawing 2 – North Parcel, depict the locations of all existing and new monitoring wells and piezometers. Drawings 1 and 2 are provided in Attachment 2 of the August 2004 Revised EI and Exhibit 2 of the Technical Memorandum.

During the well survey activities completed in August 2004 for all the existing monitoring wells and piezometers, the use of a magnetic locator was employed to locate monitoring well MW-103, which was found beneath heavy foliage and subsequently included as part of the well survey activities. Water-level measurements were obtained from all existing wells and piezometers. Table 4, provided in Exhibit E of the Technical Memorandum, tabulates the data collected during the August 2004 well survey and water-level measurement collection activities. During the water-level measurement event, separate-phase product was observed in monitoring well MW-108 and piezometer PZ-04 above the ground water table, indicating light non-aqueous phase liquid (LNAPL), such as petroleum product.

Based on the well survey and water-level measurement collection activities, a more accurate and refined groundwater contour map was developed. Drawing 3 - Groundwater Contour Map August 2004, is provided in Attachment 2 of the August 2004 Revised EI. Based on groundwater contours calculated for the latest round of water-level measurements, it is evident that groundwater flows across the Site in a southeasterly direction towards the Naugatuck River.

Groundwater samples were collected from all existing and newly installed monitoring wells on August 12, 13, and 16, 2004 for laboratory analysis for volatile organic compounds (VOCs), cyanide, and RCRA 8 metals plus copper, nickel, and zinc. Vinyl chloride was detected in groundwater from monitoring well MW-117D at a concentration of 0.6 (L) micrograms per liter ($\mu g/l$), which is below the residential and industrial/commercial Volatilization Criteria for the compound identified by the Connecticut Department of Environmental Protection (CT DEP) Remediation Standard Regulation (RSR). No other VOCs were detected in the monitoring wells situated along the western Site boundary (i.e., MW-116S, MW-116D, MW-117S, MW-117D, MW-118S, and MW-118D) at concentrations that exceed the revised residential and industrial/commercial Volatilization Criteria proposed by the CT DEP. Furthermore, as noted above, groundwater flow across the Site is towards the southeast in the direction of the Naugatuck River and not towards Steel Brook or towards off-site residences situated to the west of the Site. As such, the potential exposure risk via volatilization of contaminants in groundwater to off-site residential properties located

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southwest of the Site is eliminated. The monitoring well and piezometer installation methodology, the groundwater sample collection activities, and the groundwater sample analytical laboratory results are discussed in further detail in the Technical Memorandum provided in Attachment 5 of the August 2004 EI.

The source of the detected vinyl chloride concentrations in monitoring well MW-117D is believed to be due to historical operations.

4. *According to Figure 2, it appears that several commercial and/or industrial facilities are located south and southwest of the site, some or all of which may be populated by workers. It does not appear that the facility has included those workers in its summary of off-site receptors (Page 4). Contaminated groundwater may be migrating in a southerly or southwesterly direction, possibly beneath some of the identified commercial or industrial facilities. If so, the potential exposure to off-site workers at these commercial and/or industrial facilities by indoor air impacted by volatile organic compounds in groundwater should be assessed. While EPA and the Occupational Safety and Health Administration (OSHA) have generally agreed that OSHA will take the lead in addressing occupational exposures, EPA generally recommends that such facilities be notified of the potential for this exposure pathway and that they consider any potential exposures that may result. Revise the EI to address the potential for off-site workers in the surrounding commercial and industrial facilities to be exposed to indoor air contamination, and update the conclusions of the EI as necessary.*

There are several commercial facilities situated southeast of the Site, downgradient of flow direction. It is the opinion that there is an incomplete exposure pathway to off-site workers (receptors) in these commercial facilities. The report entitled, *Proposed Revision, Connecticut's Remediation Standard Regulations, Volatilization Criteria,* prepared by the Permitting, Enforcement and Remediation Division, Bureau of Water Management, Connecticut Department of Environmental Protection, dated March 2003, proposes that "the depth to groundwater in which these criteria (proposed) should be applied as has been increased to 30 feet...". Depth to water at all the monitoring wells along the south and southeastern Site boundary are greater than 30 feet below ground surface (Table 4 in Exhibit E of the Technical Memorandum) and as such, the VC would not apply.

As part of DEP's proposed revisions to the RSR VC, new residential and industrial/commercial criteria are proposed for several constituents. These proposed changes make Connecticut's criteria more consistent with the EPA Draft Guidance "Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soil" that was issued in November 2002. Consequently, VOC concentrations in groundwater samples collected from downgradient monitoring wells along the south, southeastern and eastern monitoring wells was compared to the DEP's proposed revised industrial/commercial volatilization criteria. The results of the comparison indicate there were no VOC concentrations that exceeded the DEP's proposed revised industrial/commercial Volatilization Criteria (industrial/commercial criteria were used for comparison since there are no residential properties downgradient of the Site).

Although groundwater at the time of the most recent measurement of water levels is at depths greater than 30 feet bgs, changes to topography and/or changes in water level can bring groundwater depths to less than 30 feet. However, as VOC concentrations downgradient of the Site are below the revised

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industrial/commercial IVC, they do not pose a human health risk to off-site workers (receptors) in the commercial facilities situated along southeast (and south) of the Site.

> *In addition, the well survey does identify the existence of some downgradient industrial water supply wells, but it has not been clarified if any of the production wells are still in use. Please verify if the wells are still in use (despite public water supply connections) and if any use of the groundwater poses a health risk.*

In February 2001, HRP Associates, Inc. completed a report entitled *Well Receptor Survey, MacDermid, Inc., 526 Huntingdon Avenue, Waterbury, Connecticut (*2001 Well Receptor Survey*)*, which was provided in the January 2004 EI, and is provided in the Attachment 8 of the August 2004 Revised EI. This 2001 Well Receptor Survey was conducted to identify public and private water supply sources (potential receptors) in what was deemed to be downgradient and sidegradient areas of the Site. The extent of the 2001 Well Receptor Survey encompassed the area within: 1,400 feet to the south (Steele Brook and Naugatuck River); 1,000 feet to the northeast (Route 8); 700 feet to the east (Naugatuck River); and, 1,000 feet to the west (Steele Brook). Five water supply wells and four industrial water supply wells were identified, but the operational status of these wells was not defined. These wells are described in the 2001 Well Receptor Survey as follows:

- Wells 12 and 12A located at 526 Huntingdon Avenue (formerly Waterbury Steel Ball Co.) were completed in 1925 and 1947, respectively. Well 12 was listed as currently unused and well 12A was listed as a well used to withdraw water for air conditioning.
- Wells 341, 341A, and 341B located at 237 E. Aurora Street, LEA Manufacturing Company, were completed in 1957, 1966, and 1967, respectively. Well 341 was listed as currently unused, and wells 341A and 341B were listed as used for industrial purposes.
- Well 343, located at 000 East Aurora Street (formerly Brock-Hall Dairy Company), was completed as a well used to withdraw water in 1945 for air conditioning purposes.

In July 2004, LEA completed a more extensive well survey that attempted to identify the current use of the public/industrial wells identified in the 2001 Well Receptor Survey. Supporting documentation is provided in Attachment 8 of the August 2004 Revised EI. The first step in identifying the current use of these public/industrial water supply wells was the completion of a document search comprising well completion reports, well abandonment reports, and any analytical data records filed at the Waterbury Department of Public Health. According to Mr. Paul Vitterelli of the Environmental Health Division of the Waterbury Department of Public Health, no information regarding groundwater related issues was found in any documentation kept on file for Wells 12, 12A, 341, 341A, 341B, and 343, or 240 Huntingdon Avenue.

A further search was performed at the State of Connecticut Department of Public Health (DPH). Raymond Jermana of the DPH informed LEA personnel on July 15, 2004 that private well records were not typically kept on file at DPH and indicated that the local city health department should be contacted for such information. Mr. Jermana did indicate that potable water supply well information was kept on file at DPH in the Drinking Water Division. LEA personnel contacted the DPH Drinking Water Division on July 15, 2004 and was informed that, as part of the DPH Drinking Water Division Source Water

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Assessment Program, water supplies utilized for potable water were tested at least annually by DPH. Such testing also involved backflow prevention inspections for well supplies at sites that are cross connected to a public water supply system. According to the DPH website, the only community water supply system located in Waterbury is operated by the Waterbury Water Department. There were no transient non-community (TCN) water supplies located in Waterbury and only five non-transient, non-community (NTNC) water supplies located in Waterbury, but none near the Site. A TCN is defined by DPH as a water system which provides water to a facility, such as a gas station or campground, where use or residence by fewer than 25 people occurs over a short period of time. These systems do not have to test or treat their potable water supply for contaminants that pose long-term health risks because fewer than 25 people drink the water over a long period of time. A NTNC water system is defined by DPH as a water system which supplies potable water to 25 or more of the same people over a period of at least six months per year in non-residential facilities such as schools, factories, office buildings, and hospitals with private water supply systems.

The Waterbury Water Department was contacted on July 15, 2004. According to Tom Caviello of the Waterbury Water Department, any backflow prevention inspections performed by the Water Department are submitted to DPH. As such, any inspections on file at the Waterbury Water Department would also be on file at the DPH.

Subsequently, files were reviewed at the State Department of Environmental Protection (DEP) and United States Geologic Survey (USGS). P-5 inspection files and permit applications for discharges to surface water or the sanitary sewer were reviewed at the DEP for sites known to have industrial water supply wells. The DEP file reviews confirmed that a P-5 inspection report had previously been completed for the property located at 237 East Aurora Street (LEA Manufacturing). In addition, a report entitled *Engineering Report on Modifications to Meet Acute Toxicity Limits at Waterbury Rolling Mills, Waterbury, CT*, prepared by Fuss & O'Neill and dated December 30, 1989, was reviewed at the DEP. The report contained a drawing, entitled "Water Flow Diagram – Sheet 1 of 2", that depicted a groundwater water supply well as a source for industrial use at the 240 Huntingdon Avenue (Rolling Mills Company) property.

A USGS file review did not reveal any new information, regarding Wells 12, 12A, 341, 341A, 341B, and 343, or the well located at 240 Huntingdon Avenue, Waterbury Rolling Mills. The only documentation found for these wells at the USGS is provided in the 2001 Well Receptor Survey.

Based on LEA's 2004 industrial/public well survey, it appears that the industrial supply wells at 237 East Aurora Street and 240 Huntingdon Avenue are used solely for industrial use. 526 Huntingdon Avenue, 420 Huntingdon Avenue, and at least a parcel of 000 East Aurora Street are now owned by MacDermid. The industrial supply wells at the Site are not used for potable water supply. Therefore, the wells identified in the 2001 Well Survey do not appear to be used for potable water supply.

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SPECIFIC COMMENTS

1. *On Page 8 of the comment response letter, the facility states that the "EI Determination has been revised to indicate in Question 2 that it is unknown whether surface water and sediment downgradient of the Site at the discharge location of groundwater into the Naugatuck River are 'contaminated.'" However, in Question 2 of the EI, both surface water and sediment are marked "YES," they are known or reasonably suspected to be "contaminated" above appropriately risk-based levels. Potential exposure pathways for surface water and sediment are further assessed in Question 3. Revise the EI to address the inconsistencies between the cover letter and the EI report.*

The August 2004 Revised EI incorporates new groundwater sampling data, as well as water-level elevation data collected in August 2004. The results of the groundwater sample data and the refined groundwater contour map have altered the response provided in the January 2004 EI.

2. *Page 4 of the EI indicates that manufacturing activities have ceased at the facility, but limited shipping and receiving of raw product still occurs in the East Aurora Street building. The report later states, on page 11, that "the absence of workers at this facility eliminates a complete exposure pathway for indoor air." Page 2 of the comment response letter indicates that operations at the facility have ceased, the buildings are unoccupied, and that routine inspections of short duration will be the extent of worker activity at the site. The facility needs to clarify whether workers are present at the site for the limited shipping and receiving activities that were mentioned on Page 4. If so, the facility should revise the EI to list indoor air for on-site workers as a complete exposure pathway even if OSHA will take the lead in addressing such occupational exposures for stabilization.*

The August 2004 Revised EI has been modified to state that operations at the facility have ceased, the buildings are unoccupied, and that routine inspection of short duration will be the extent of worker activity at the Site.

3. *In Question 3 (Pages 12-13), MacDermid is concluding that the surface water and sediment exposure pathways are considered incomplete since both the Naugatuck River and Steele Brook are deemed inaccessible to recreators. However, it is not apparent whether a full survey of upgradient and downgradient sections of these water bodies have been conducted by MacDermid to determine accessibility, or whether the local health board or other agency has been contacted with regards to recreator use of the surface water bodies in the vicinity of the site. According to an evaluation by the Connecticut Department of Public Health for the Chase Brass Copper Site, which is located approximately 1 mile upstream of the MacDermid site on the Naugatuck River, "common eel, brown trout, fall fish, brook trout, dace and clams live in the river and fishing is popular in the area [of the Chase Brass Copper Site]. Furthermore, the evaluation stated that "according to EPA and the Waterbury Health Department, there are individuals who access the riverbank within the [Chase Brass Copper] Disposal Area in order to fish in the Naugatuck River" (Public Health Evaluation of Environmental Data and the Environmental Protection Agency Remediation Plans, Chase Brass and Copper Site, Waterbury, New Haven, Connecticut, prepared by Connecticut Department of Public Health under a Cooperative Agreement with the*

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Agency for Toxic Substances and Disease Registry, March 7, 2002, accessed online at http://www.atsdr.cdc.gov/HAC/PHA/chasebrass/cbc_p1.html#atta).

In addition, it was reported to EPA that MacDermid may have promoted or considered promoting fishing tournaments in the vicinity of the site at one time. Please provide additional information to clarify recreational use (promoted or otherwise) and other uses of the river in the vicinity of the site. Given the close proximity of the MacDermid facility to the Chase Brass Copper Site and the reported recreational use of the Naugatuck River, surface water and sediment may be complete exposure pathways for recreators. With this in mind, ingestion of fish may be considered a complete exposure pathway.

Revise the EI to further elaborate on the sources used to support the determination that the Naugatuck River is inaccessible to recreators, or collect additional information to adequately characterize the use of the Naugatuck River. If the Naugatuck River is determined to be used by recreators based on any new information, then revise the EI to address the complete exposure pathway for recreators with respect to surface water and sediment.

As mentioned by the EPA, an evaluation was completed by the Connecticut Department of Public Health for the Chase Brass Copper Site, which is located approximately 1 mile upstream of the MacDermid site on the Naugatuck River, and summarized in a report entitled, *Chase Brass and Copper Site, Waterbury, New Haven County, Connecticut, EPA Facility ID: CTD000856708,* prepared by the Connecticut Department of Public Health, and dated March 7, 2002 (DPH Report). The DPH Report stated that "common eel, brown trout, fall fish, brook trout, dace and clams live in the river and fishing is popular in the area [of the Chase Brass Copper Site]." Furthermore, the DPH Report indicated that the Naugatuck River was used for fishing from the shoreline at the Chase Brass and Copper facility by trespassers.

To further address the EPA's query as to the whether a full survey of upgradient and downgradient sections of the waterbody have been conducted by MacDermid to determine accessibility, or whether the local health board or other agency has been contacted with regards to recreator use of the surface water bodies in the vicinity of the site, a detailed evaluation was completed. This evaluation encompassed a physical survey of the environment surrounding the Naugatuck River and interviews with applicable agencies.

The physical survey was completed along the stretch of the Naugatuck River from the point where Hancock Brook merges with the Naugatuck River to the West Main Street Bridge at Route 8 to determine the potential locations of accessible paths and docks, and the potential presence of recreators fishing or operating water crafts. This particular stretch of the Naugatuck River was chosen for the physical survey based on the determination that groundwater discharged from the Site to surface water along this area. Of immediate note was the infeasibility to access the Naugatuck River from the west bank due to the presence of a major interstate highway identified as Route 8. The topography of land between Route 8 and the west bank of the Naugatuck River is steeply sloped and heavily vegetated. Similarly, industrial and commercial development, heavy foliage, and lack of pathways along the eastern bank of the Naugatuck River provide extensive limitations for recreator access. In addition, it was observed that there did not appear to be any docks that could potentially be used by recreators to dock crafts or complete any recreational fishing activities. Photographic documentation is provide in Attachment 9 of the August 2004

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Revised EI. However, that does not eliminate the potential for boaters to navigate through the stretch of the Naugatuck River from upgradient or downgradient areas not identified in the physical survey.

An interview was conducted with Mr. Bob Orciari, a fisheries biologist, with the CT DEP Bureau of Natural Resources Fisheries Division on July 22, 2004. The interview incorporated queries as to recreator fishing and accessibility to the Naugatuck River along the stretch of the River mentioned above. Mr. Orciari confirmed that recreator fishing along the shoreline did occur along this stretch. In addition, there is only one access point along this stretch, located adjacent to the eastern bank of the Naugatuck River along Thomaston Avenue. Mr. Oricari also indicated that at one time in the past, Trout Unlimited hosted a small fishing gathering. Since that time, there haven't been any fishing tournaments or gathering hosted by associations or companies.

To further determine if groundwater that discharges to the surface water of the Naugatuck River may be contaminated from former Site operations, existing and newly installed monitoring wells were sampled for VOCs, cyanide, and RCRA 8 metals plus copper, nickel, and zinc. A comparison of the August 2004 groundwater sample analytical laboratory results was performed against the Surface Water Protection Criteria (SWPC) identified in the RSRs. It was determined that only one VOC constituent was detected in one downgradient monitoring well (based on groundwater flow direction) along the southeastern Site boundary that exceeded the SWPC. Tetrachloroethylene (PCE) was present in monitoring well MW-115 at a concentration of 280 micrograms per liter ($\mu g/l$), which is above the tabulated SWPC of 88 $\mu g/l$.

An alternative SWPC criterion was calculated for PCE in accordance with the methodology described in the RSRs using the human health criterion for "organisms only", as tabulated in Appendix D of the State of Connecticut Water Quality Standards. For PCE, the human health criteria for "organisms only" is 8.85 $\mu g/l$. According to the RSR, an alternative, site-specific SWPC may be calculated for a site in order to determine whether groundwater discharging from a specific site has the potential to affect water quality in the surface water body to which such groundwater discharges. In this case, groundwater flowing beneath the Site discharges to the Naugatuck River, located approximately 1,000 feet southeast of the Site. Calculations to determine an alternative SWPC were performed in accordance with the methodology provided in Section 22a-133k-3 (b)(3)(A) of the RSR. The 7Q10 for the Naugatuck River was obtained from report entitled, *Total Maximum Daily Load Analysis for the Upper Naugatuck River, Thomaston, CT*", prepared by the Connecticut Department of Environmental Protection. The value of 12.6 cubic feet per second given in that report for the 7Q10 of the Naugatuck River at Thomaston, Connecticut, was actually a very conservative value in terms of the actual 7Q10 for the Naugatuck River in the vicinity of the MacDermid facility, since Thomaston is located a considerable distance upstream of Waterbury. Therefore, if the concentrations at the site are below the conservatively calculated alternative SWPC, there can be a high level of assurance that the groundwater discharging from the Site to the Naugatuck River will not result in a condition that would pose a risk to human health.

To further increase the conservative nature of the assessment of the potential risk associated with groundwater discharging from the Site to the Naugatuck River, the plume of groundwater exiting the Site exhibiting contamination due to the PCE was estimated conservatively to exhibit a width of approximately 970 feet along the southeastern property boundary. The more likely width of the plume for which elevated PCE concentrations (concentrations in excess of the tabulated SWPC identified in the RSRs) are believed to be present is closer to 280 feet.

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According to *The Bedrock Geology of the Waterbury Quadrangle* published in 1967 by the State Geological and Natural History Survey of Connecticut and the depths at which refusal was reached at locations on the Site where deep monitoring wells were installed, the approximate depth to bedrock near the Site is 60 feet below grade. This was conservatively established as the lower bound of the plume of groundwater exiting the Site at a concentration of 280 µg/l. As the depth to groundwater below the Site is approximately 30 feet, an estimated saturated thickness of contamination in groundwater below the site is 30 feet. The groundwater discharge in this area was calculated conservatively using the dimensions of the plume and an average hydraulic conductivity (K) of 56 feet per day, which was determined based upon the nature of the unconsolidated materials in the saturated zone -- a very fine to fine sand. The average horizontal hydraulic gradient was calculated using the groundwater contours from the August 2004 groundwater sampling event and was calculated to be 0.004 feet/foot. The groundwater discharge (K * hydraulic gradient * area of the plume) for the Site was calculated to be 272, 160 cubic feet/day. As described in the RSRs, 25% of the 7Q10 for the river was then divided by the volume of plume discharging to the river, which resulted in a dilution factor of 41.7, which is again, a very conservative value for this Site.

To calculate an alternative SWPC for the Site, the human health criteria for "organisms only" of 8.85 µg/l was multiplied by the calculated dilution factor of 41.7, resulting in a very conservative estimate for an alternative SWPC for PCE discharging from the Site of 369 µg/l. Consequently, the PCE concentration of 280 µg/l that was detected in groundwater from monitoring well MW-115 is less than the calculated alternative SWPC of 369 µg/l , indicating that groundwater discharging from the Site does not pose a risk to human health via a surface water pathway.

Based on the DPH report, the physical survey, and the interview with Mr. Orciari of the DEP, there is one access point along the stretch of the Naugatuck River where the physical survey was completed, and that recreator fishing from the shoreline does occur along this stretch. However, PCE concentrations in MW-115 are below the calculated alternative SWPC. As such, exposure to surface water, sediment and ingestion of fish is not considered to pose a human health risk. The August 2004 Revised EI reflects this new data.

4. *On Page 10 of the cover letter (No. 12), MacDermid has indicated that it is no longer necessary to calculate a revised dilution attenuation factor (DAF) in order to determine the potential impact of site groundwater discharge to surface water and sediment of the Naugatuck River and Steele Brook for two reasons: 1) MacDermid concludes that contaminated groundwater beneath the site does not appear to discharge to Steele Brook, and 2) the Naugatuck River is deemed inaccessible and not considered an exposure pathway. However, as mentioned in General Comment No. 1, the site groundwater elevation data provided with the report may indicate a southwesterly flow component, inferring potential discharge to Steele Brooke. In Specific Comment No. 3 above, recreators may also be using the Naugatuck River in the vicinity of the site. If additional investigations find these items to be representative of site conditions, the facility will need to revisit EPA's previous comments regarding calculation of a site-specific DAF in previous EPA Comment No. 12. The facility will also need to revisit EPA's previous comment No. 13 as well, addressing calculation of the alternative surface water protection criteria for the site (Comments 12 and 13 will need to be revisited for final remedy if not for stabilization).*

RESPONSE TO COMMENTS

Groundwater flow direction is southeasterly towards the Naugatuck River. Groundwater does not flow in the direction of Steele Brook. In addition, based on the DPH report, the physical survey, and the interview with Mr. Orciari of the DEP, there is one access point along the stretch of the Naugatuck River where the physical survey was completed, and that recreator fishing from the shoreline does occur along this stretch. As discussed in further detail in Question 4 above, PCE concentrations in MW-115 are below the calculated alternative SWPC. As such, exposure to surface water, sediment and ingestion of fish is not considered to pose a human health risk. The August 2004 Revised EI reflects this new data.

5. *In Table 1, Exceedances of Surface Water Protection Criteria for Groundwater, the results reported for well MW-115 indicate a 1,1-dichloroethylene concentration of 160 H ug/l. The "H" also appears in the results for other compounds detected on Tables 1, 2 and Table 4, but it does not appear to have been defined. Please revise the tables to include a "Notes" section that clarifies the meanings of "H" and any other abbreviations used throughout the tables.*

A "Notes" section has been provided with the Tables in Attachment 6 of the August 2004 Revised EI. That clarifies the meanings of "H" and any other abbreviations used throughout the tables.